

15. OBSERVATIONS ON LARGE SCALE DESTRUCTION OF CARP EGGS IN BREEDING HAPAS BY THE COMMON CARP, *CYPRINUS CARPIO* (LINNAEUS)

Considerable progress has been made in India in the application of the technique of induced breeding of Indian carps for commercial production of quality seed (Chaudhuri & Alikunhi 1957; Chaudhuri 1966; Ibrahim & Chaudhuri 1966; Ranganathan *et al* 1967; Bhowmick & Chaudhuri *in press*). One of the serious problems encountered during regular induced breeding experiments at Cuttack has been the mysterious disappearance of large quantities of eggs from breeding *hapas*. Though pituitary injected breeders used to spawn completely, only very few eggs could be recovered finally from the *hapas*, resulting in considerable loss of spawn year after year. While conducting induced breeding experiments at Cuttack, Alikunhi *et al* (1964) noticed the disappearance of eggs from breeding *hapas*. It is also reported (Anon, 1967) that synthetic enzymes and foul water containing a lot of micro-organisms cause quick disintegration of eggs. However, no satisfactory explanation has been advanced so far for the large scale disappearance of eggs from *hapas*.

During the 1967 fish breeding season the presence of a number of specimens of *Cyprinus carpio* (common carp) inside a slightly torn breeding *hapa*, in which a set of rohu had spawned, gave room for suspicion that this species could be the cause for the large scale destruction of eggs. Since eggs developed normally when kept in hatching *hapas*, in the same pond or in trays with the same pond water, the question of pond water having anything to do with the destruction of eggs was ruled out. A series of experiments were, therefore, conducted to confirm whether common carp was actually responsible for the destruction of eggs.

A breeding *hapa* was fixed in a pond having Indian and Chinese carps (grass carp and silver carp), common carp and other fishes, and measured quantity of eggs were released in it, but the eggs were not recovered. A small portion of the same pond was subsequently partitioned with fry net cloth after ensuring that there were no fishes in the partitioned area and breeding *hapas* were fixed on both sides of the partition. Measured quantities of eggs were then introduced in both the *hapas*. Survival of eggs in the protected *hapa* was quite satisfactory in contrast to very poor survival in the unprotected one.

Complete survival of eggs was recorded when eggs were introduced in breeding *hapas* fixed in ponds where there was no fish population, or the fishes consisted of only the Indian major carps catla, rohu and

mrigal or the Chinese grass carp and silver carp or weed fishes like *Oxygaster*, *Puntius* and *Amblypharyngodon*. Thus, observations conducted in a number of ponds suggested that none of these fishes destroyed eggs.

Direct observations carried out in a small channel confirmed the inference that common carp was causing the destruction of eggs. The channel was partitioned into two with a small-meshed wire net and eleven common carp were released on one side of the partition, the other side serving as control. Measured quantities of eggs were then released in breeding *hapas* fixed on either side of the partition actually within a distance of a few centimetres. In the stocked section common carp were observed to hover around the *hapa* and nibble and suck at it repeatedly with their protrusible mouth. At the end of the experiment eggs were completely recovered from the control *hapa* in contrast to very poor survival in the *hapa* fixed in the stocked half of the channel.

All the experiments when repeated five to six times gave similar results and pooled data are presented in the table.

DETAILS OF VARIOUS EXPERIMENTS CARRIED OUT
SHOWING PREDATION OF EGGS BY COMMON CARP

Sl. No.	Experimental Environment	No. of eggs released in <i>hapa</i>	No. of eggs recovered after five to six hours
1.	Pond having no fish in it	552,000	552,000
2. (a)	Pond having Indian and Chinese carp, common carp and other smaller fishes	759,000	6,000
(b)	Partitioned portion of the same pond but without any fish	380,000	380,000
3.	Pond having Indian and Chinese carps and common carp	362,000	20,000
4.	Pond having only Indian major carps	345,000	345,000
5.	Pond having only Chinese carps	207,000	207,000
6. (a)	In channel with wire net partition having only common carp	586,000	40,000
(b)	In the same channel, outside wire net partition having no common carp	586,000	586,000

Common carp can penetrate silty bottom to a depth of over 12 cm. (Nikolsky 1963) and up to 6 cm. in hard clay substrata in search of food (Alikunhi 1966). The situation of the mouth prevents the fish from catching its food straight from water, and it picks its food by sucking from the bottom (Sarig 1966). Alikunhi (*loc. cit.*) states

that common carp being an opportunistic polyphagous feeder takes its food according to local availability. They are reported to feed on young and eggs of game fishes (Malpas 1920) and prey on the spawn of other species including the Sacramento perch (Wales 1942). The tactile and taste organs of this benthophagic carp are used for searching prey (Nikolsky, *loc. cit.*). Helped by these organs the fish are probably attracted towards the breeding *hapas* having large quantities of eggs. They move around the *hapa* and suck at its sides and bottom. Being demersal in nature, the eggs settle down in the *hapa* and as the fish suck from outside, the egg shells apparently break. It is evident that the presence of small openings on the breeding *hapa* cloth, intended for free movement of water, adds to the efficiency of the sucking power of common carp. This has been demonstrated by keeping eggs in *hapa* of finer meshed cloth where the extent of damage to the eggs was less than in the breeding *hapa*.

Thus, eggs in breeding *hapas* fixed in a pond having common carp are subject to heavy destruction by this fish. Indian and Chinese carps as well as weed fishes do not cause such damage to the eggs. It is therefore necessary that ponds having no common carp in them should be selected for induced breeding work.

Further, predation of carp eggs by common carp recorded here and the destruction of young and eggs of game fishes and perch referred to earlier in this note could be investigated for control and culture of fishes like *Tilapia* where there is problem of over-population.

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16. INDUCED BREEDING OF MAJOR CARPS IN GUJARAT STATE WITH A NOTE ON SPAWNING OF CARPS IN BOKH RESERVOIR, PRANTIJ

The area of water available in Gujarat State for pisciculture amounts to about 5000 hectares, but only 2000 hectares are being utilised for fish culture and the State requires about 7.6 million fry for stocking them as against the present production of only 1.6 million, the bulk of which is obtained from rivers (Anon. 1966). The State used to import large quantities of fry from West Bengal involving expenditure, for instance of Rs. 2550 for 0.26 million fish seed from Calcutta in 1961 (Anon. 1966).

Since the success of induced breeding of carps in India (Chaudhuri & Alikunhi 1957) and development of this technique (Chaudhuri 1960; Alikunhi *et al* 1960; Chaudhuri 1954) the technique has been successfully applied for production of quality fish seed on a commercial scale in several States and in Gujarat since 1962, the production of fish seed has gone up in succeeding years by the application of this method (Anon. 1966). An account of the induced breeding experiment in 1962 in the State for the first time and a note on the natural spawning of carps in Bokh reservoir, Prantij, are presented here.

An extensive survey conducted in 1962 showed that carps bred in Bokh reservoir, Prantij, connected with the Hatmati River. During monsoon, this reservoir receives rain water from an extensive catchment area and also from the Hatmati River. The ecological conditions are generally comparable to those of the wet type of bundhs described by Alikunhi *et al* (1964) around Nowgong, Madhya Pradesh.

Spawning of minor carps and other small fishes was observed throughout day and night on 13 July 1962 with inundation of the